

A new species of *Petrophile* (Proteaceae) from south-western Australia

Ray J. Cranfield and Terry D. Macfarlane

Western Australian Herbarium. Postal address: Science Division, Department of Environment and Conservation,
Locked Bag 2, Manjimup, Western Australia 6258

Abstract

Cranfield, R.J. & Macfarlane, T.D. A new species of *Petrophile* (Proteaceae) from south-western Australia. *Nuytsia* 17: 153–158 (2007). A new species, *Petrophile vana* Cranfield & T. Macfarlane, is described from the Murchison and Yalgoo Bioregions of Western Australia. The new species is known from only three localities where it grows on laterite breakaway ridges. It is illustrated and mapped, and comparisons are made with *P. pauciflora* Foreman from the same region.

Introduction

A specimen of this new species (*R.J. Cranfield* 6191) was collected in 1987 during a survey of rangelands in the Murchison region but it was not able to be identified as a known species of *Petrophile* R.Br. ex Knight or the morphologically similar genus *Isopogon* R.Br. ex Knight. A revision of *Petrophile* in the “Flora of Australia” series (Foreman 1995) did not include this specimen, either because it was insufficiently known to describe as new or more likely because it was seen too late for inclusion. The species *Petrophile pauciflora* Foreman, which is recorded for the same area as the new species described here, was described as new in Foreman’s revision. *R.J. Cranfield* 6191 bears the following annotation by D.B. Foreman: “*Isopogon* sp. nov. (check against *P. pauciflora*?). 9/8/1995” which indicates that it is a presumed new species similar to *P. pauciflora* Foreman but also suggests doubt about its generic placement (unless “*Isopogon*” was a slip of the pen). Subsequent collections made in 1996 and 2000 from additional localities supported the distinctness of this species from *P. pauciflora* in leaf, inflorescence and floral features, which led to it being given the informal phrase name *Petrophile* sp. Mt Magnet (*R.J. Cranfield* 6191) in December 2000 and to its formal description here as new.

Methods

All specimens of the new species described here are present in the Western Australian Herbarium (PERTH) and were examined along with a selection of flowering specimens of *P. pauciflora*. All floral characters were measured either by ruler, measuring lens or stereo microscope eye-piece graticule. Several flowers were dissected to enable measurements of the floral parts and to investigate any immature nut or cone characters, as no mature cones have been collected as yet. Species distributions are based on the Interim Biogeographic Regionalisation for Australia (IBRA) Version 5.1 categories as modified on FloraBase (Thackway & Cresswell 1995; Western Australian Herbarium 1998–; Environment Australia 2000). The distribution map was created using DIVA-GIS freeware Version

5.2.0.2 based on IBRA Version 6.1. (Department of the Environment and Water Resources 2007) using coordinates from collections lodged at PERTH. The distribution of *P. pauciflora* is updated from that shown by Foreman (1995) using records from PERTH, which were all checked for identification accuracy. Precise locality statements are withheld for species of conservation concern.

Description

Petrophile vana Cranfield & T.Macfarlane, *sp.nov.*

Petrophile pauciflorae Foreman affinis sed foliis haud divisis, inflorescentiis axillaribus, sessilibus, et stylo partialiter glabro differt.

Typus: Melangata Station, Western Australia [precise locality withheld for conservation purposes], 17 September 1987, *R.J. Cranfield* 6191 (*holo:* PERTH 04186753; *iso:* MEL).

Petrophile sp. Mt Magnet (*R.J. Cranfield* 6191), Western Australian Herbarium, in FloraBase, <http://florabase.dec.wa.gov.au> [accessed August 2007].

Shrub to 1.5 m but usually lower, branches smooth barked, juvenile branches with long white hairs. *Leaves* alternate, sessile, erect and curving inwards towards branches, terete, 30–60 mm long, 1–1.5 mm diam., dorsal surface with a shallow groove which when dried appears as a line, sericeous when young, becoming minutely scabrid; apex with a short brown pungent tip. *Inflorescence* axillary, sessile, of globose to ovate heads, 10 mm long, 3–4 mm wide, 1–4-flowered. *Involutural bracts* *c.* 4, imbricate, ovate, *c.* 1–1.5 mm long, glabrous except for long white hairs on upper margin; apex acute. *Cone scales* ovate to lanceolate becoming recurved, slightly thickened, 2–3 mm long, 2–3 mm wide with dense white hairs at base and glabrescent towards apex; apex obtuse to acute with a naked point. *Tepals* 7–10 mm long, with dense white to cream indumentum, separating from the base and falling united or partly separated. *Anthers* 4, in cup-shaped recesses near tip of tepal, 3–4 mm long, *c.* 1 mm wide. *Style* 8–9 mm long, erect, kinked below the middle, hirsute for a short distance above the ovary sometimes extending to the kink, glabrous in the middle section up to and including the basal part of the pollen presenter, pollen presenter 3.5–4.5 mm long, 0.5–0.75 mm wide, fusiform or narrowly ovoid, terete or angular, yellow, with a brush of short rigid spreading 0.1–0.15 mm long hairs evenly distributed over the surface, the whole brush being covered with pollen at flower opening, tapering to a glabrous apical part bearing a small capitate terminal stigma. *Cones* ovoid with long tufts of white hairs protruding between cone scales, mature cones not seen. *Fruit* a small nut (only immature ones seen), *c.* 2 mm long, compressed obovoid, with very long erect or antrorse hairs on the basal half of the nut mainly on either side, with a few at the centre on the adaxial surface, medium length appressed hairs on the basal half of the abaxial surface, the remainder of the nut surface (the distal half and most of the proximal half of the adaxial surface) is puberulent. (Figure 1)

Other specimens examined. WESTERN AUSTRALIA: [localities withheld] 10 Sep. 1996, *S. Patrick* 2765 B (PERTH); 14 Sep. 2000, *P. Smith & B. Murphy* GC 5900 (PERTH).

Distribution and habitat. Known only from three localities over a range of *c.* 150 km within the Murchison and Yalgoo IBRA Bioregions of Western Australia (Figure 2). Growing in shallow, white, gritty clay-soil pockets on a laterite breakaway platform. In one location noted as occurring in an open heath of *Thryptomene* spp.

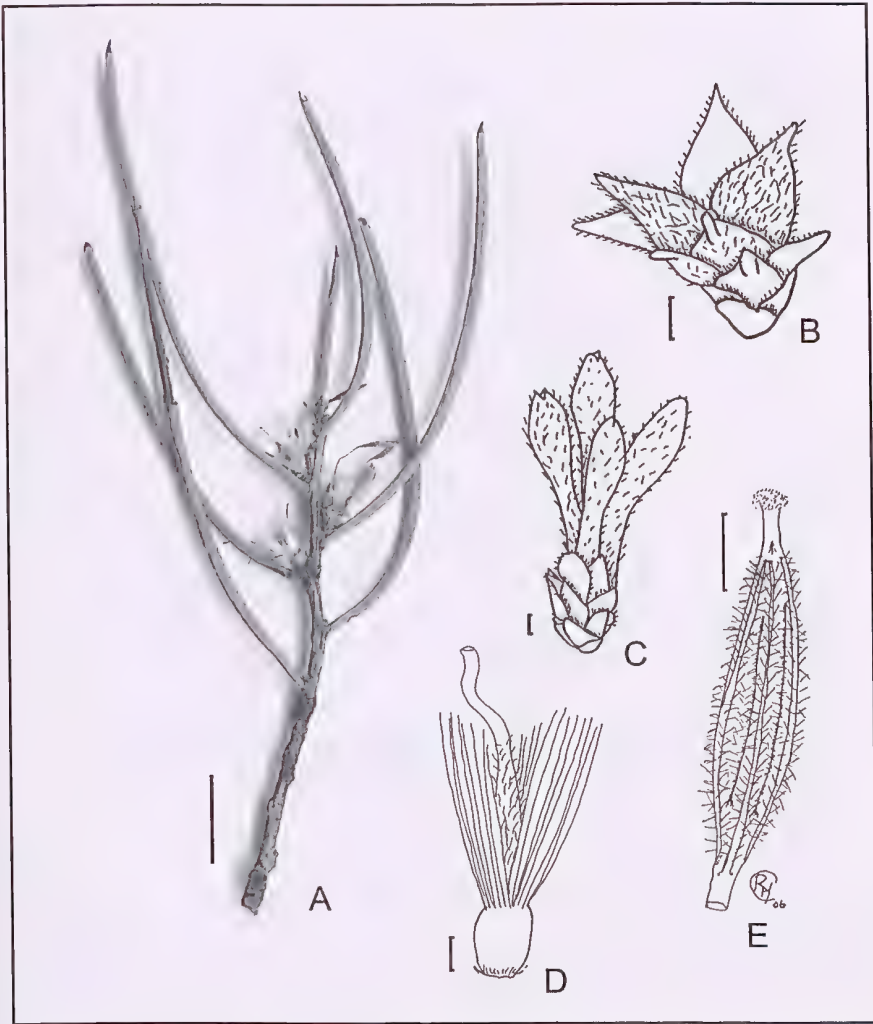


Figure 1. *Petrophile vana*. A – shoot showing axillary inflorescences (perianth shed); B – involucral bracts and cone scales; C – inflorescence with flower buds; D – ovary and lower part of style; E – pollen presenter. A, C, D – R.J. Cranfield 6191; B, E – P. Smith & B. Murphy GC 5900. Drawings by R.J. Cranfield. Scale bars = 1 mm.

Flowering period. September.

Conservation status. Department of Environment and Conservation's Conservation Codes for Western Australian Flora: Priority One (Atkins 2006). This species is currently known from only three collections from separate locations. One of these locations is threatened by mining-associated activities and reported as degraded, another is affected by goat-grazing. A third collection is from land currently managed for conservation. Further field surveys are required to better assess the conservation status of this species and to determine whether active protection is required. As *P. vana* appears to be at risk from disturbance and is readily grazed by feral stock, there may be some urgency in investigating its conservation status in case grazing pressure is preventing recruitment of seedlings.

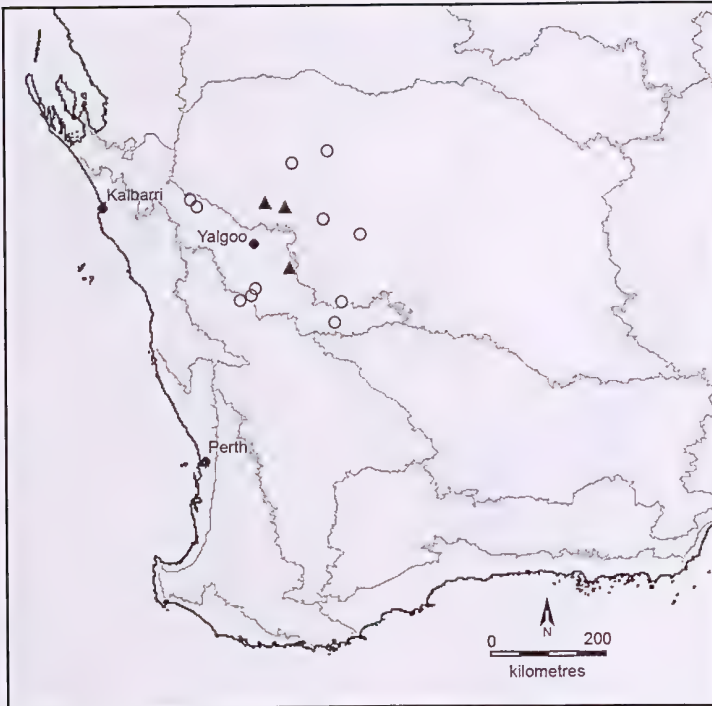


Figure 2. Map of southern Western Australia showing the distributions of *Petrophile vana* (▲) and *P. pauciflora* (○), with IBRA Bioregion boundaries indicated.

Etymology. The specific epithet is from the Latin word *vanus* in the sense of trifling, referring to the non-showy appearance of the plant.

Notes. There is some ambiguity in the generic placement of the new species, and the previously mentioned specimen annotation by D.B. Foreman may indicate that he had the same uncertainty. The available specimens of *Petrophile vana* have only immature fruits and there are no persistent fruits visible from previous seasons. It is unknown whether the particular plants from which the specimens were taken had conditions suitable for fruiting in recent seasons, or whether this lack is due to the cone scales shedding after fruiting, a feature normally considered characteristic of *Isopogon*. The nuts of *P. vana* accord better with *Petrophile*, being compressed and with a hair distribution not characteristic of *Isopogon*. Although they have hairs over the whole surface, the very long, erect or antrorse hairs on the basal half of the nut are mainly on either side, with a few at the centre on the adaxial surface; on the basal half of the abaxial surface the long hairs are considerably shorter than those elsewhere. The upper half of the nut surface and most of the adaxial surface is puberulent. The nuts are very similar to those of *P. pauciflora* as illustrated by Foreman (1995: 175), a species with inflorescences having long-persistent cone scales, consistent with *Petrophile*. Other characters of *P. vana* which support a placement in *Petrophile* include the separation of the tepals from the base and the falling of the tepals while still joined for part of their length, the simple fusiform shape of the pollen presenter, its uniform coverage of hairs over which the pollen is spread at anthesis, and the presence of long, spreading hairs on the basal part of the style. This set of characters is strongly contrary to the conditions found in *Isopogon*, so the new species is considered well-placed in *Petrophile*.

Petrophile vana seems to be most similar to *P. pauciflora* although there are several clear differences (Table 1). Of these, the divided leaf and terminal, pedunculate inflorescences of *P. pauciflora* are conspicuous. The two species grow in the same region, with *P. pauciflora* surrounding the known distribution of *P. vana* (Figure 2). These two species are the only two members of the *Petrophile* and *Isopogon* group growing in the Yalgoo and Murchison Bioregions and, in fact, outside the northern section of the South-West Botanical Province (with the possible exception of collections of other species close to the Province boundary). Both species occur in a similar habitat, on lateritic upland surfaces. It is not known whether there are observable environmental features which could explain the geographical separation of the two species.

Table 1. Characters distinguishing *Petrophile vana* and *P. pauciflora*.

Organ	Character	<i>P. vana</i>	<i>P. pauciflora</i>
Leaf	shape	undivided	trifid in distal 1/3
	length (mm)	30–60	10–40
	dorsal furrow	present	absent
	surface (when mature)	scabrid	glabrous
Inflorescence	position	axillary	terminal
	peduncle length (mm)	0	10–25
	flowers per cone	1–4	c. 8
Style	indumentum (below brush)	glabrous in middle third	hairy throughout

Acknowledgements

The authors thank Paul Wilson for translating the Latin diagnosis, Kelly Shepherd and Verna Tunsell for help with the figures and the reviewer for useful suggestions. This paper is a contribution to the Western Australian Government's 'Saving Our Species' biodiversity conservation initiative.

References

- Atkins, K.J. (2006). "Declared Rare and Priority Flora list for Western Australia." (Department of Environment and Conservation: Kensington, Western Australia.)
- Department of the Environment and Water Resources (2007). IBRA Version 6.1. <http://www.environment.gov.au/parks/nrs/ibra/version6-1/index.html>. Updated 6th February 2007. [accessed August 2007]
- Environment Australia (2000). Revision of the Interim Biogeographic Regionalisation for Australia (IBRA) and Development of Version 5.1 - Summary Report. <http://www.environment.gov.au/parks/nrs/ibra/version5-1/summary-report/index.html> [accessed August 2007]
- Foreman, D.B. (1995). *Petrophile*, *Isopogon*. In: P. McCarthy (Ed.) "Flora of Australia." Vol. 16, pp. 149–223 (Australian Biological Resources Study and CSIRO Australia: Melbourne.)
- Thackway, R. & Cresswell, I.D. (1995). An interim biogeographic regionalisation for Australia: a framework for establishing the national system of reserves. Version 4.0. (Australian Nature Conservation Agency, Canberra.)
- Western Australian Herbarium (1998–). FloraBase—The Western Australian Flora. Department of Environment & Conservation. <http://florabase.dec.wa.gov.au> [accessed August 2007]

